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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,118	05/19/2006	Bhanu Prakash Kirgaval Nagaraja Rao	L2005.0022/P022	7431

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EXAMINER	
BITAR, NANCY	

ART UNIT	PAPER NUMBER
2624	

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12/23/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,118	NAGARAJA RAO ET AL.	
	Examiner	Art Unit	
	NANCY BITAR	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) *1-3 and 11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-10,12 and 13* is/are rejected.

7)☒ Claim(s) *4-8 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/19/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-3, drawn to "estimating the position of a brain landmark including the steps of determining whether a region of a midsagittal radiological image includes a groups of pixels having intensity in defined range..

Group II, claim(s) 4-13, drawn to estimating the position of AC and PC landmarks including the steps of using misdagittal radiological images to estimate the position of th AC and PC landmarks and generating axial radiological images and using these images to improve the estimate of the position of the AC and PC landmarks.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: group 1 require determining whether a group of pixels have an intensity in a defined range comprises a first" special technical feature" and group II teaches forming axial radiological images from midsagittal images and using these" to improve the estimate of the position of the

AC and PC landmarks comprises a second special technical feature. Since the two of groups of the claims do not share any of the technical features a restriction is required.

3. During a telephone conversation with Mr. Stephen Soffen on 12/19/2008 a provisional election was made with traverse to prosecute the invention of claims 4-13 (note that examiner will interpret that claims 12 and 13 depend on claim 4) ; claims 1-3 are withdrawn from consideration.

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Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

4. Claim(s) 12-13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 12-13 defines " a computer apparatus and a computer program" embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed " a computer apparatus and a computer program"can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Examiner Notes

5. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the

references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

Information Disclosure Statement

6. The information disclosure statement filed 5/19/2006 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Objections

7. Claims 4-8 are objected to because of the following informalities: the words" and/or" is not enable in the specification. The use of and/or" can be used only if it is supported by three embodiment (position of the AC, position of the PC , and position of the AC and PC together) Appropriate correction is required.

8. Claim 11 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should not refer to more than one claim. See MPEP § 608.01(n). Accordingly, the claim 11 has not been further treated on the merits.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 4-10,12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verard et al (Fully automatic identification of AC and PC landmarks on brain MRI using scene analysis) and Sun et al (Anatomic labeling of PET brain images with automatic detection of AC and PC)

As to claims 4 and 6, Verard et al teaches method of estimating the position of the AC and/or PC landmarks which includes:

(a) using a midsagittal radiological image to estimate the position of the AC and/or PC landmarks in the midsagittal plane (page 613, column 2,);

(b) using the estimated position of the AC and/or PC landmarks to generate one or more axial and/or coronal radiological images, including at least one image including the estimated position of the AC and/or PC landmark (*Localization of the PC and the AC*: Identification of the superior Co allows one to draw [Fig. 2(b)] a small window (approximately 1 1cm) which includes the PC with certainty. Two convolution masks designed for a 1.5 mm voxel size [Fig. 7(a)] are applied independently to the pixels located inside this window. The first one is a directional edge enhancement filter, while the second one acts as a template modeling of the typical grey-level intensity variations close to the PC. Finally, an operation of multiplication of the resulting images is carried out whose maximum value provides a coarse localization of the PC. This coarse position is fine grained by application of a second matched filter inside a smaller region, centered on the previously found the PC position and zoomed by bicubic interpolation, page 614, column 2, lines 6-35); While Verard meets a number of the limitations of the claimed invention, as pointed out more fully above, Verard fails to specifically

teach use of misdagittal images to improve the estimate of the position of the AC and/or PC landmarks . Specifically, Sun et al. automatic method for finding anterior commissure (AC) and posterior commissure (PC) in positron emission tomography (PET) brain image without a reference image is discussed. For labeling and localizing] anatomical structures, a PET image aligned in parallel to the detected AC-PC line is normalized spatially into the corresponding trans axial Talairach brain. Moreover, Sun et al teaches estimating the AC and PC positions on misdagittal radiological images and generating axial radiological images and analysing these to improve the estimate of the position of the landmarks (figure 3 and caption) it would have been obvious to one of ordinary skill in the art to estimate the positions on misdagittal radiological images in order to make the clinical evaluation images easier, fast and accurate .Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 5, Verard et al teaches the method according to claim 4 in which the images are axial images, and step (c) includes deriving a mean ventricular line (MVL), and determining the position of the AC and/or PC landmarks by scanning intensity values along the MVL (The mean of differences between automatic calculation and manual pointing was close to zero and the standard deviation is established at about 0.35 for both axial and coronal angulations, page 615, column 1 line 24, column 2 lines 1-45)

As to claim 7, Verard et al teaches the method according to claim 4 in which the images are coronal images, and step (c) includes deriving a symmetry line within a first coronal image including estimates of the position of the AC and/or PC landmarks, and determining the position of the landmark by scanning intensity values along the symmetry line (to provide a better intensity contrast, especially in the AC and PC vicinities, we decided tooperate on a pseudo midsagittal image, obtained by assigning to each pixel the lower value in grey-level intensity from the midsagittal and its two adjacent planes, page 613, column 2)

As to claim 8, Verard et al teaches the method according to claim 7 in which there are a plurality of images relating to different coronal slices including second images of coronal slices neighboring the first coronal slice, the method further including the step of determining dimensions of the AC and/or PC landmarks using the second images (The parameters of the ellipse (center coordinates, axes dimensions and , angle) can be easily calculated with a least mean square algorithm with 16 points of a transaxial brain slice contour on a binary image by employing a threshold, which is not critical since it may range between three and 20 times the background grey level, page 612, column 1)

As to claim 9 and 10, Verard method according to claim 4 in which the landmark is the AC and the landmark is the PC(To localize the AC and the PC, we use a step-by-step scene analysis which allows one to gradually converge, first to PC then to AC, as illustrated in Fig. 2(b), page 611, column 1)

The limitation of claims 12-13 has been addressed above.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jingge Wu/
Supervisory Patent Examiner, Art Unit 2624

Nancy Bitar 12/20/2008